

Enhanced L/D and Virtual Shaping of NLF Sections, Phase II

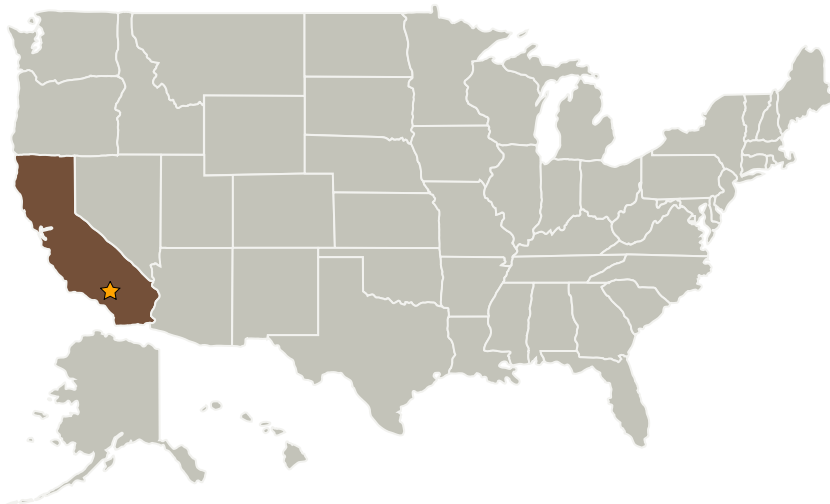
Completed Technology Project (2007 - 2009)



Project Introduction

A novel and robust flow control technique for the virtual shaping of extended run Natural Laminar Flow (NLF) sections has been developed. The virtual shaping and separation control technology can be used to control the size and extent of extremely large separation bubbles to virtually shape the aft recovery region of the airfoil. The system uses a novel pressure porting technique that requires no external air source to produce a pulsed tangential jet in the separated region capable of partially or fully eliminating the presence of the separation bubble. The novel pulsed jet system was shown to produce equivalent results to continuous blowing using approximately a 42% lower jet velocity and 87% lower momentum coefficient. The virtual shaping of an extended run NLF section could offer radical performance enhancement in the form of increased lift-to-drag and maximum lift. Additionally, the system will produce a wing design enabling a hinge-less, full-span virtual shaping capability, which can be used for pilot reactive roll control, span load tailoring, and gust load alleviation. The system will provide significantly enhanced performance for the air vehicle throughout the entire flight envelope.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Rolling Hills Research Corporation	Supporting Organization	Industry	El Segundo, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.4 Pressure Gain Combustion